

DROSOPHILA HEDGEHOG
CHICKEN HEDGEHOG-A
CHICKEN HEDGEHOG-B

R	C	K	E	K	L	N	V	L	A	Y	S	V	M	N	E	W	P	G	I	R	L	L	V	T
R	C	K	E	R	V	N	S	L	A	I	A	V	M	H	M	W	P	G	V	R	L	R	V	T
R	C	K	D	K	L	N	A	L	A	I	S	V	M	N	Q	W	P	G	V	K	L	R	V	T

DROSOPHILA HEDGEHOG
CHICKEN HEDGEHOG-A
CHICKEN HEDGEHOG-B

E	S	W	D	E	D	Y	H	H	G	Q	E	S	L	H	Y	E	G	R	A	V	T	I	A	T
E	G	W	D	E	D	G	H	H	L	P	D	S	L	H	Y	E	G	R	A	L	D	I	T	T
E	G	W	D	E	D	G	H	H	S	E	E	S	L	H	Y	E	G	R	A	V	D	I	T	T

DROSOPHILA HEDGEHOG
CHICKEN HEDGEHOG-A
CHICKEN HEDGEHOG-B

S	D	R	D	Q	S	K	Y	G	M	L	A	R	L	A	V	E	A	G	F	D	W	V
S	D	R	D	R	H	K	Y	G	M	L	A	R	L	A	V	E	A	G	F	D	W	V
S	D	R	D	R	S	K	Y	G	M	L	A	R	L	A	V	E	A	G	F	D	W	V

FIGURE 1

1 - - - - - H D H H S S V P W A S A A S V T C L S L D A K C H S S S S S S S S S K S A A S S I CHICKEN SONIC HEDGEHOG
1 H D H H S S V P W A S A A S V T C L S L D A K C H S S S S S S S S S K S A A S S I DROSOPHILA HEDGEHOG

1 - - - - - H V E H L L L T R I L L V G F I C A L L V S CHICKEN SONIC HEDGEHOG
41 S A I P Q E E T Q T H R H I A H T Q R C L S R L T S L V A L L L I V L P H V F S DROSOPHILA HEDGEHOG

23 S G L T C G P G R G I G K R R H P K K L T P L A Y K Q F I P N V A E K T L G A S CHICKEN SONIC HEDGEHOG
81 P A H S C G P G R G L G R H R - A R H L Y P L V L K O T T P N L S E Y T H S A S DROSOPHILA HEDGEHOG

63 G R Y E G K I T R N S E R F K E L T P N Y N P D I I F K D E E N T G A D R L H T CHICKEN SONIC HEDGEHOG
120 G P L E G V I R R D S P K F K D L V P H Y N R D I L F R D E P C T G A D R L H S DROSOPHILA HEDGEHOG

103 Q R C K D K L H A L A I S V H N Q W P G V K L R V T E C H D E D G H H S E E S L CHICKEN SONIC HEDGEHOG
160 K R C K E K L H V L A Y S V H N E W P G I R L L V T E S H D E D Y H H G Q E S L DROSOPHILA HEDGEHOG

143 H Y E G R A V D I T T S D R D R S K Y O H L A R L A V E A Q P D H V Y Y E S K A CHICKEN SONIC HEDGEHOG
200 H Y E G R A V T I A T S D R D Q S K Y G H L A R L A V E A Q P D H V S Y V S R R DROSOPHILA HEDGEHOG

183 H I H C S V K A E H S V A A K S G C C F P O S A T V H L E H Q O T K L V K D L S CHICKEN SONIC HEDGEHOG
240 H I Y C S V K S D S S I S S H V H Q C F T P E S T A L L E S G V R K P L O E L S DROSOPHILA HEDGEHOG

223 T G D R V I A A D A D G R L L Y S D F L T F L D R H D S S R K L F Y V I E T R Q CHICKEN SONIC HEDGEHOG
280 I G D R V L S H T A N Q Q A V Y S E V I L F H D R H L E Q H Q N E V O L H T - D DROSOPHILA HEDGEHOG

263 P R A R I L L T A A H I L F V A P Q H N Q S E A T Q S T S Q A L F A S H V K P CHICKEN SONIC HEDGEHOG
319 Q G A V L T V T F A H L V S V H Q - - - - - P E S Q K L T F V F A D R I E E DROSOPHILA HEDGEHOG

303 G O R V Y V L G E G G O Q L L P A S V H S V S L R E E A S G A Y A P L T A Q G T CHICKEN SONIC HEDGEHOG
352 K H O V L V R D V E T G E L R P Q R V V K V G - S V R S K G V V A P L T R E G T DROSOPHILA HEDGEHOG

343 I I I H R V L A S C Y A V I E E H S H A H H A F A P F R L A Q G L - - - L A A - CHICKEN SONIC HEDGEHOG
391 I V V H S V A A S C Y A V I N S Q S L A H H G L A P H R L L S T L E A W I P A K DROSOPHILA HEDGEHOG

379 - - L C P D G A I P T A A T T T T O I H H Y S R L L Y R I G S H V L D O D A L H CHICKEN SONIC HEDGEHOG
431 E Q L H S S P K V V S S A Q Q Q H Q I H H Y A N A L Y X V K D Y V L P Q S H R H DROSOPHILA HEDGEHOG

417 F L G H V A P A S CHICKEN SONIC HEDGEHOG
471 D DROSOPHILA HEDGEHOG

FIGURE 2

08954771-10097

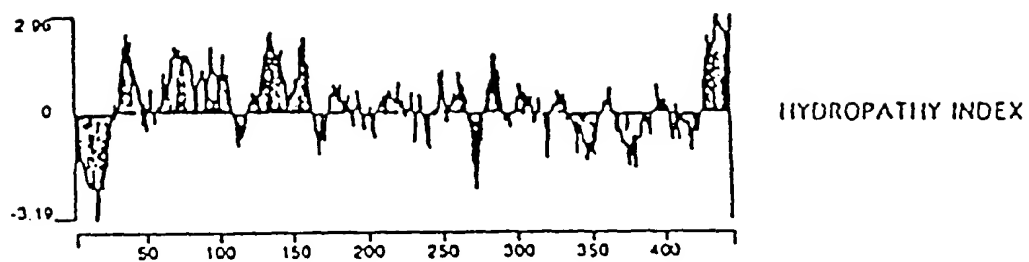


FIGURE 3

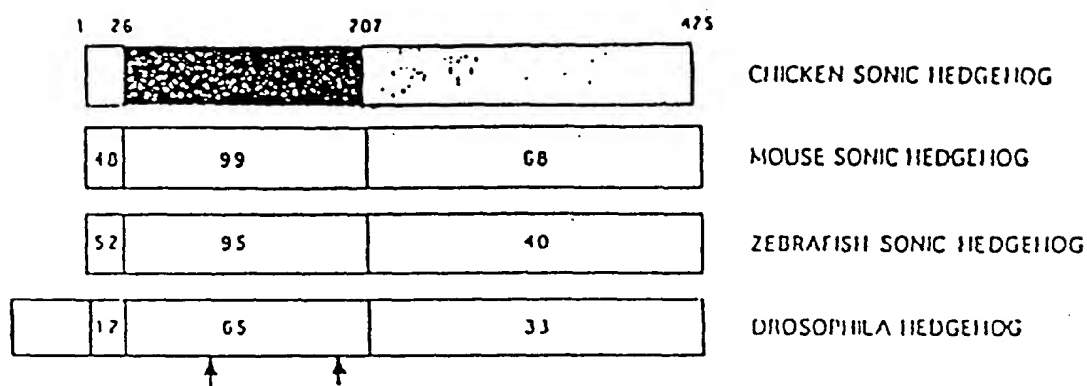


FIGURE 4

03954771 102097

b-hh	1	MDNHSSVPWA	SAASVTCLSL	DAKCHSSSSS	SSSKSAASSI	SAIQEETQT
M-Dhh		.....	.....	.....	.....	.....
M-Ihh		.....	.....	.....	.....	.....
M-Shh		.....	.....	.....	.....	.....
C-Shh		.....	.....	.....	.....	.....
Z-Shh		.....	.....	.....	.....	.....
D-hh	51	MRHIAHTQRC	LSRLTSLVAL	LLIVLPMVFS	PAHSCGPGRG	LGRHR...AR
M-Dhh		.....	..MALPASLL	PLCCLALLAL	SAQSCGPGRG	PVGRRRYVRK
M-Ihh		.....	.....	.....	.....	.....
M-Shh		.....	MLLLLARCFL	VILASSLLVC	PGLACGPGRG	FGKRRH..PK
C-Shh		.....MV	EMLLLTRILL	VGFCALLVS	SGLTCGPGRG	IGKRRH..PK
Z-Shh		.....	..MRLLTRVLL	VSLLTSLV	SGLACGPGRG	YGRRRH..PK
D-hh	101	NLYPLVLKQT	IPNLSEYTN	ASGLEGVIR	RDSKPKDLV	PNYNRDILPR
M-Dhh		QLVPLLYKQF	VPSMPERTLG	ASGPAEGRVT	RGSEFRDLV	PNYNPDIIYK
M-Ihh		.....	.....	.....	...ERFKELT	PNYNPDIIYK
M-Shh		KLTPLAYKQF	IPNVAEKTG	ASGRYEGKIT	RNSERFKELT	PNYNPDIIYK
C-Shh		KLTPLAYKQF	IPNVAEKTG	ASGRYEGKIT	RNSERFKELT	PNYNPDIIYK
Z-Shh		KLTPLAYKQF	IPNVAEKTG	ASGRYEGKIT	RNSERFKELT	PNYNPDIIYK
D-hh	151	DEEGTGADRL	MSKRCCKELN	VLAYSVMNEW	PGIRLLVTEZ	WDEDYHGOE
M-Dhh		DEENSGADRL	MTQRCCKELN	ALAIAMNMW	PGVRLRVTEG	WDEDGHAOD
M-Ihh		DEENTGADRL	MTQRCCKELN	SLAISVMNQW	PGVRLRVTEG	RDEDGHESEE
M-Shh		DEENTGADRL	MTQRCCKELN	ALAISVMNQW	PGVRLRVTEG	WDEDGHESEE
C-Shh		DEENTGADRL	MTQRCCKELN	ALAISVMNQW	PGVRLRVTEG	WDEDGHESEE
Z-Shh		DEENTGADRL	MTQRCCKELN	SLAISVMNQW	PGVRLRVTEG	WDEDGHESEE
D-hh	201	SLHYEGRAVD	IATSDRDQSK	YGLARLAVE	AGFDWVSYS	RREIYCSVKS
M-Dhh		SLHYEGRALD	ITTSDRDRNK	YGLARLAVE	AGFDWVYYS	RNEIHVSVKA
M-Ihh		SLHYEGRAVD	ITTSDRDRNK	YGLARLAVE	AGFDWVYYS	KAEVHCVSKS
M-Shh		SLHYEGRAVD	ITTSDRDRSK	YGLARLAVE	AGFDWVYYS	KARIHCSVKA
C-Shh		SLHYEGRAVD	ITTSDRDRSK	YGLARLAVE	AGFDWVYYS	KARIHCSVKA
Z-Shh		SLHYEGRAVD	ITTSDRDRSK	YGLARLAVE	AGFDWVYYS	KARIHCSVKA
D-hh	251	DSSISSHVHG	CFTPESTALL	ESGVRKPLGE	LSIGDRVLMS	TANGQAVYSE
M-Dhh		DNSLAVRAGG	CFPGNATVRL	RSGERKGLRE	LHRGDWVLA	DAAGRVVPTP
M-Ihh		EHSAAKTGG	CFPAGAQVRL	ENGERVALSA	VKPGDRVLAM	GEDGPTTFSD
M-Shh		ENSVAAKSGG	CFPGSATVHL	EQGGTKLVKD	LRPGDRVLA	DDQGRLLYSD
C-Shh		ENSVAAKSGG	CFPGSATVHL	EHGGTKLVKD	LSPGDRVLA	DADGRLLYSD
Z-Shh		ENSVAAKSGG	CFPGSALVSL	QDGGQKAVKD	LNPGRDKVLA	DSAGNLVFS
D-hh	301	VILFMDRNL	QMONTVOLHT	DGGAVLTVT	PAHLVSVWQ	.....PESQ
M-Dhh		VLLFLDRDLQ	RRASFVAVET	ERPPRKLLLT	PWHLVFAAR	...GPAPAPG
M-Ihh		VLLFLDREPN	RLRAFQVIET	QDPPRLALT	PAHLFIADN	HTE....PAA
M-Shh		FLTFLDREDEG	AKKVYFVIET	LEPRERLLLT	AAHLFFVAP	HNDGPTPGP
C-Shh		FLTFLDREDEG	SRKLFYVIET	RQPRARLLLT	AAHLFFVAP	HNDGPTPGP
Z-Shh		FIMPTDRDST	TRRVFYVIET	QEPVEKITLT	AAHLFFVLDN	STEDLHMT
D-hh	351	KLTFVFADRI	EEKNOVLV..	RDVETGELRP	QRVVKVG.SV	RSKGVVAPLT
M-Dhh		DFAPVFARRL	RAGDSVLA..	..PGGDALQP	ARVARVA.RE	EAVGVFAPLT
M-Ihh		HFRATFASHV	QPGQYVLV..	..SGVPGLQP	ARVAASV.TH	VALGSYAPLT
M-Shh		S..ALFASRV	RPGQRYVVA	ERGGDRLLP	AAVHSVTLRE	EEAGAYAPLT
C-Shh		SGQALFASNV	KPGQRYVVLG	E..GGQQLLP	ASVHSVSLRE	EASGAYAPLT
Z-Shh		...AAYASSV	RAGQKVMVVD	DSGQLKSVIV	QRIYT....E	EQRGSPAPVT
D-hh	401	REGTIVVNSV	AASCYAVINS	QSLAHWGLAP	MRLSTLEAW	LPAKEQLHSS
M-Dhh		AHGTLLVNDV	LASCYAVLES	HQWAHRAFAP	LRLHALGAL	LP.....
M-Ihh		RHGTLLVEDV	VASCFAAVAD	HHLAQLAFAP	LRLFPSL...	.....
M-Shh		AHGTILINRV	LASCYAVIEE	HSWAHRAFAP	FRLAHALLAA	LAPARTDGGG
C-Shh		AQGTILINRV	LASCYAVIEE	HSWAHRAFAP	FRLAQGLLAA	LCP.....
Z-Shh		AHGTIVVDRI	LASCYAVIED	QGLAHLAFAP	ARLYYYVSSF	LSP.....
D-hh	451	PKVV.....	...SSAQOQN	GIHWYANALY	KVKDYVLPQS	WRHD*
M-Dhh		.....	...GGAVQPT	GMHWYSRLLY	RLAEELMG*	.....
M-Ihh		.....	..AWGSWTPSE	GVHSYPQMLY	RLGRLLLEES	TFHPLMGSGA
M-Shh		GGSIAPAAQSA	TEARGAEPTE	GIHWYSQLLY	HIGTWLLDSE	RHPLMGMAVK
C-Shh		DGAIPTA...	...ATTIT	GIHWYSRLLY	RIGSWVLDGD	ALHPLMGMAVK
Z-Shh		KTPAVGPMRL	YNRRGSTGTP	GSC.....H	QMGTWLLDSN	MLHPLMGMAVK
M-Ihh	501	GS*				
M-Shh		SS*				
M-Shh		AS*				
M-Shh		SS*				

FIGURE 5A

Figure 5B

M-Dhh:	C	G	P	G	R	G	P	V	R	K	Q	L	V	L	Y	K	Q	F	V	P	S	M	P	E	R	T	L	G	A	S	G	P	A	E	G	R	V	T	R	G	S	E	R	F	R	D	L	V								
M-Ihh:	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*				
H-Ihh:	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*				
H-Shh:	C	G	P	G	R	G	F	G	K	R	R	H	*	*	P	K	K	L	T	P	L	A	Y	K	Q	F	I	P	N	V	A	E	K	T	L	G	A	S	G	R	Y	E	G	K	I	S	R	N	S	E	R	F	K	E	L	T
C-Shh:	C	G	P	G	R	G	I	G	K	R	R	H	*	*	P	K	K	L	T	P	L	A	Y	K	Q	F	I	P	N	V	A	E	K	T	L	G	A	S	G	R	Y	E	G	K	I	T	R	N	S	E	R	F	K	E	L	T
M-Shh:	C	G	P	G	R	G	F	G	K	R	R	H	*	*	P	K	K	L	T	P	L	A	Y	K	Q	F	I	P	N	V	A	E	K	T	L	G	A	S	G	R	Y	E	G	K	I	T	R	N	S	E	R	F	K	E	L	T
Z-Shh:	C	G	P	G	R	G	Y	G	R	R	R	H	*	*	P	K	K	L	T	P	L	A	Y	K	Q	F	I	P	N	V	A	E	K	T	L	G	A	S	G	R	Y	E	G	K	I	T	R	N	S	E	R	F	K	E	L	T
CON:	C	G	P	G	R	G	X	X	X	R	R	X	X	X	P	K	X	L	P	L	X	Y	K	Q	F	X	P	X	X	X	E	X	T	L	G	A	S	G	X	X	E	G	X	X	X	R	X	S	E	R	F	X	X	L	T	

[illegible]

H A Q D S L H Y E G R A L D I T S D R D R N K Y G L L A R L A V E A G F D W V Y E S R N H I H V S V K A D
H S E S L H Y E G R A V D I T T S D R D R N K Y G L L A R L A V E A G F D W V Y E S K A H V H C S V K S E
H S E S L H Y E G R A V D I T T S D R D R N K Y G L L A R L A V E A G F D W V Y E S K A H V H C S V K S E
H S E S L H Y E G R A V D I T T S D R D R S K Y G M L A R L A V E A G F D W V Y E S K A H I H C S V K A E
H S E S L H Y E G R A V D I T T S D R D R S K Y G M L A R L A V E A G F D W V Y E S K A H I H C S V K A E
H S E S L H Y E G R A V D I T T S D R D R S K Y G M L A R L A V E A G F D W V Y E S K A H I H C S V K A E
H F E S L H Y E G R A V D I T T S D R D K S K Y G T L S R L A V E A G F D W V Y E S K A H I H C S V K A E
H X X S L H Y E G R A X D I T T S D R D X X K Y G X L X R L A V E A G F D W V Y E S X X H X H X S V K X X

	M-Dhh	M-Ihh	C-Shh	Zf-Shh	D-hh
M-Shh	61 (77)	63 (78)	84 (92)	68 (80)	48 (64)
M-Dhh		58 (75)	61 (77)	54 (71)	51 (68)
M-Ihh			64 (78)	61 (75)	48 (68)
C-Shh				68 (80)	49 (64)
Zf-Shh					47 (64)

FIGURE 6

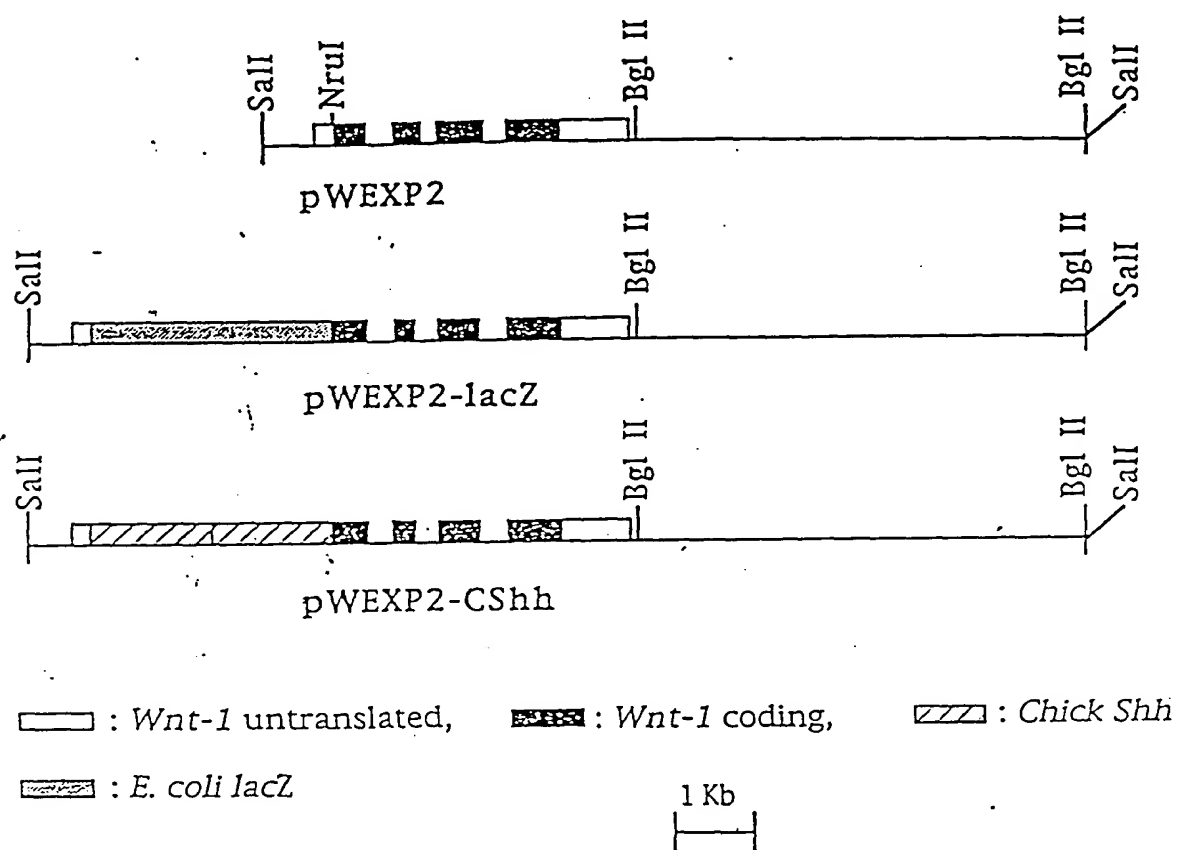


FIGURE 7

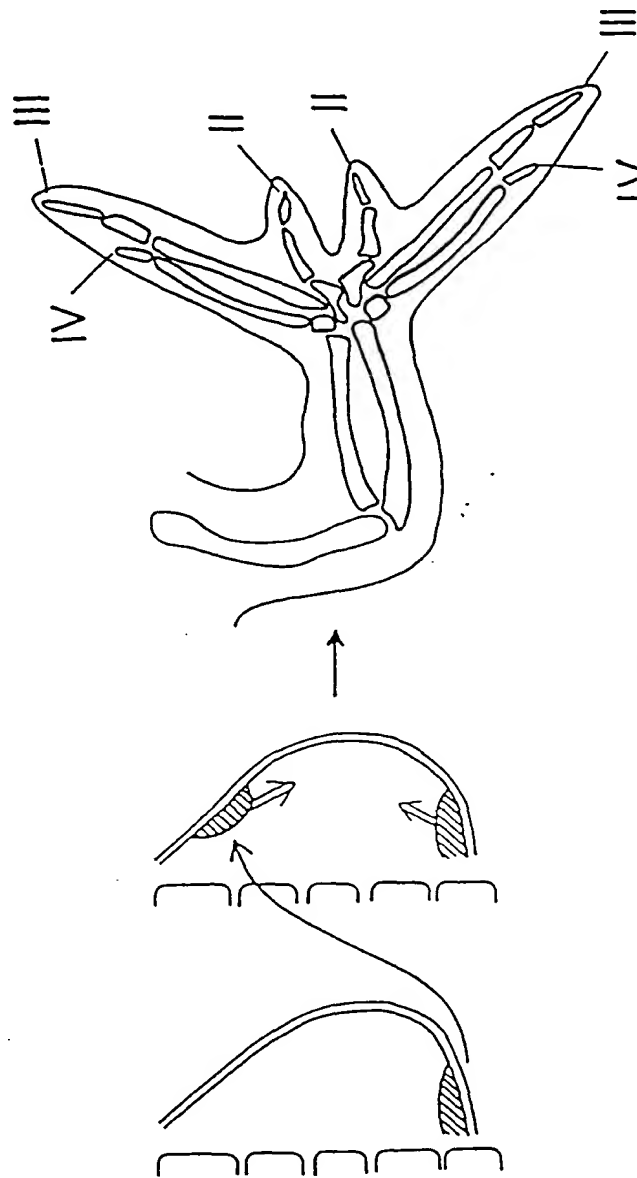
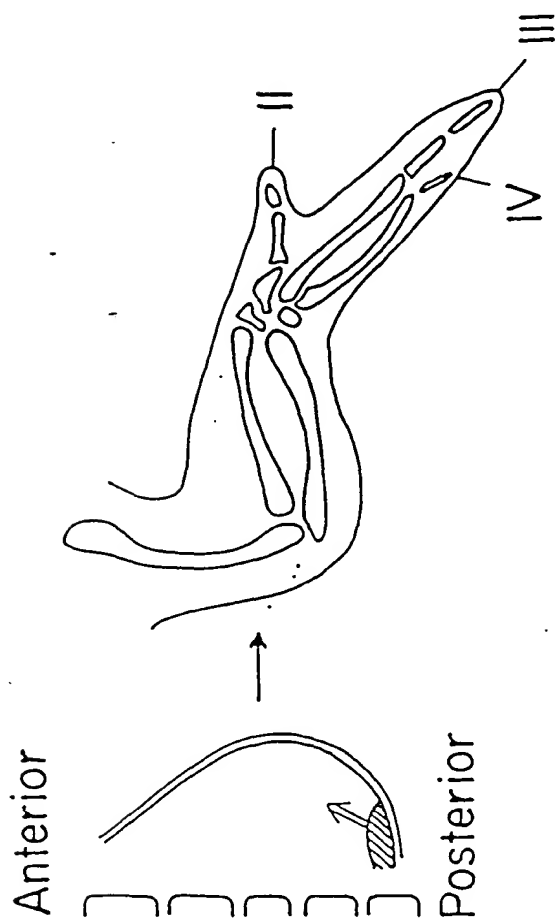


FIGURE 8

```

hh 1 MDNHSSVPWASAASVTCLSLDAKCHSSSSSSSSSKSAASSISAIPQEETQT
shh .....

hh 51 MRHIAHTQRCLSRYLTSLVALLLIVLPMVFSPAHSYCGPGRGLGRHR.ARNYL
shh 1 .....MRLYLTRVLLVSLYLTSLVVS.GLACGPGRGYGRRRHPKKL

hh 100 YPLVLKQTIPNLSEYYTNSASGPLEGVIRRDSPKFKDLVPNYNRDILFRDE
shh 40 TPLAYKQFIPNVAEKTYLGASGRYEGKITRNSERFKELTPNYPDIIFKDE

hh 150 EGTGADRLMSKYRCKEKLNVLAYSVMNEWPGIRLVVYTESWDEYDYHHGQESL
shh 90 ENTGADRLMTQRCKDKLNSLAISVMNHWPGVKLRVTEGWDEYDGHYFEESL

hh 200 HYEGRYAVTIATSDRDQSKYGMYLARLAVEAGFDWVSYYVSRRIYCSVKYSDS
shh 140 HYEGRYAVDITTSYDRDKSKYGTLSRLAVEAGFDWVYYESKAHIHCSVKAEN

hh 250 SISSHVHGCFYTPESTALLESYGVRKPLGELSYIGDRVLSMTANGQAVYSEVI
shh 190 SVAAKSGGCFYPGSALVSLQDGGQKAVKDLNPGDKVLAADSAGNLVFSDFI

hh 300 LFMDRNLEQMYQNFVQLHT.DGGAYVLTVTPAHLVSVWQPESQKL...TFVF
shh 240 MFTDRDSTTRRVFYYVIETQEPVEKITLTAYAHLYLFVLDNSTEDLHTMTAAY

hh 347 ADRIEKNQVLVRDVETGELRPQRVVKVGSVRSKGVVAPLTREGTIVVNS
shh 290 ASSVRAGQKVMVVD.DSGQLKSVIVQRIYTEEQRGSFAPVTAHGYTIVVDR

hh 397 VAASCYAVINSQSLAHWGLAPMRLYLSTLEAWLPAKEQL.....HSS
shh 339 ILASCYAVIEDQGLAHLAFAPARLYYVSSFLSPKTPAVGPMRLYNRRGS

hh 438 PKVYVSSAQYQNGIHWYANALYKVKDYVLPQSWRHD 471
shh 389 TGTPGSCHQMGTWLLDSNMLHPLGMSV..... 415

```

FIGURE 9A

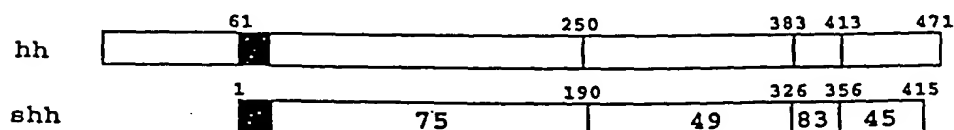


FIGURE 9B

hh
s hh
hh [a]
hh [b]

FIGURE 10

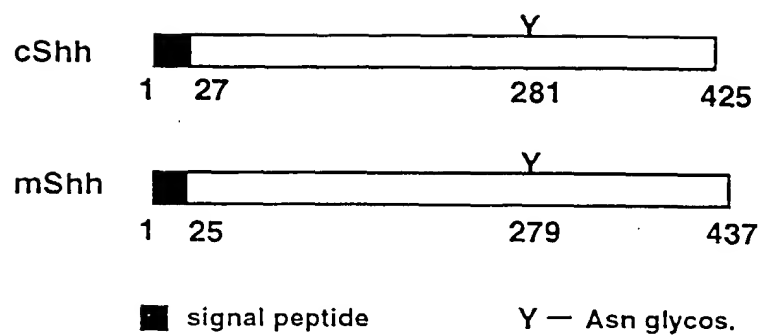


FIGURE 11

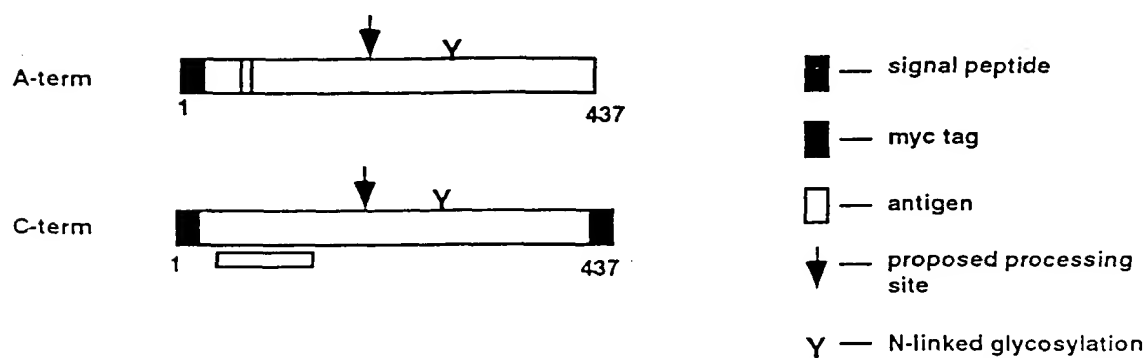


FIGURE 12

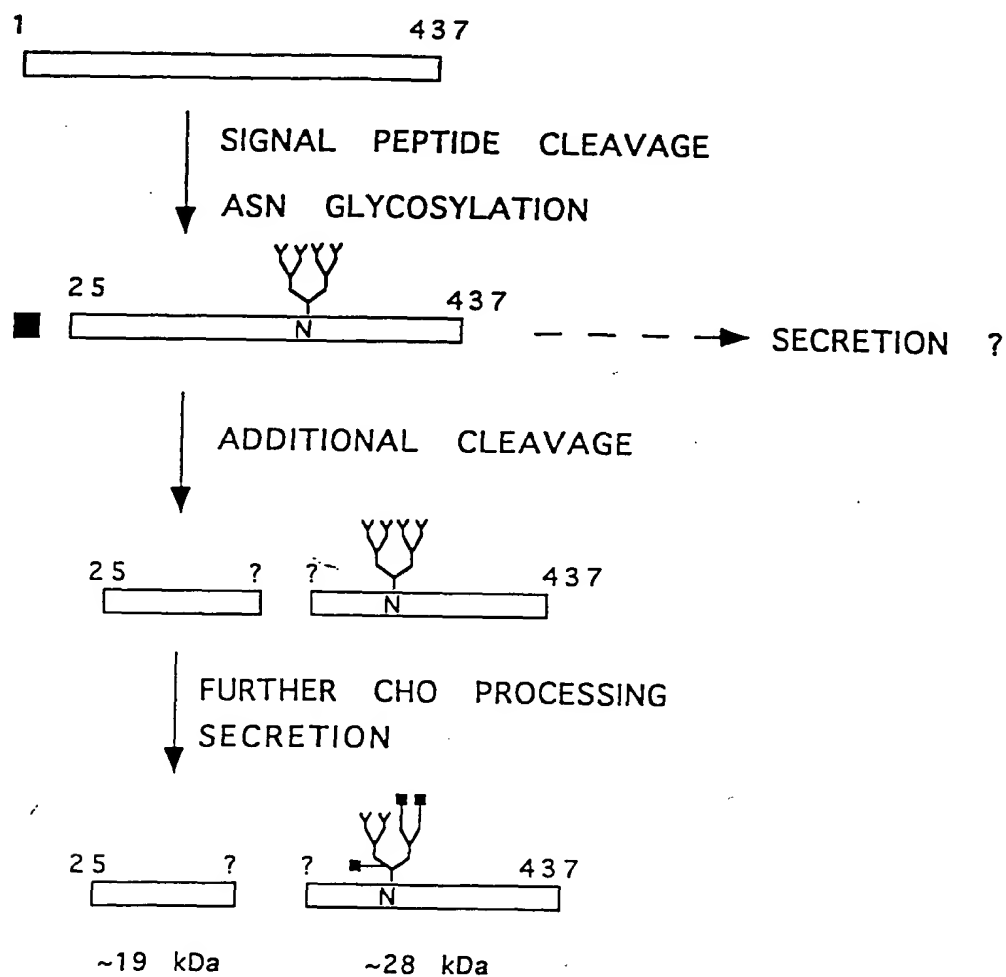


FIGURE 13

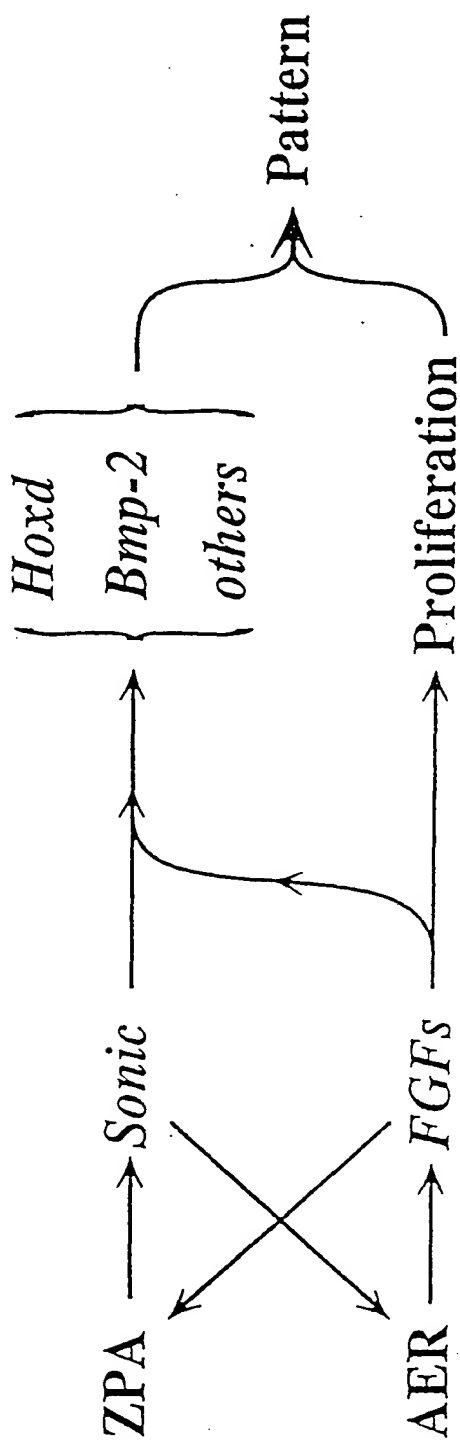


FIGURE 14

08954771-102097

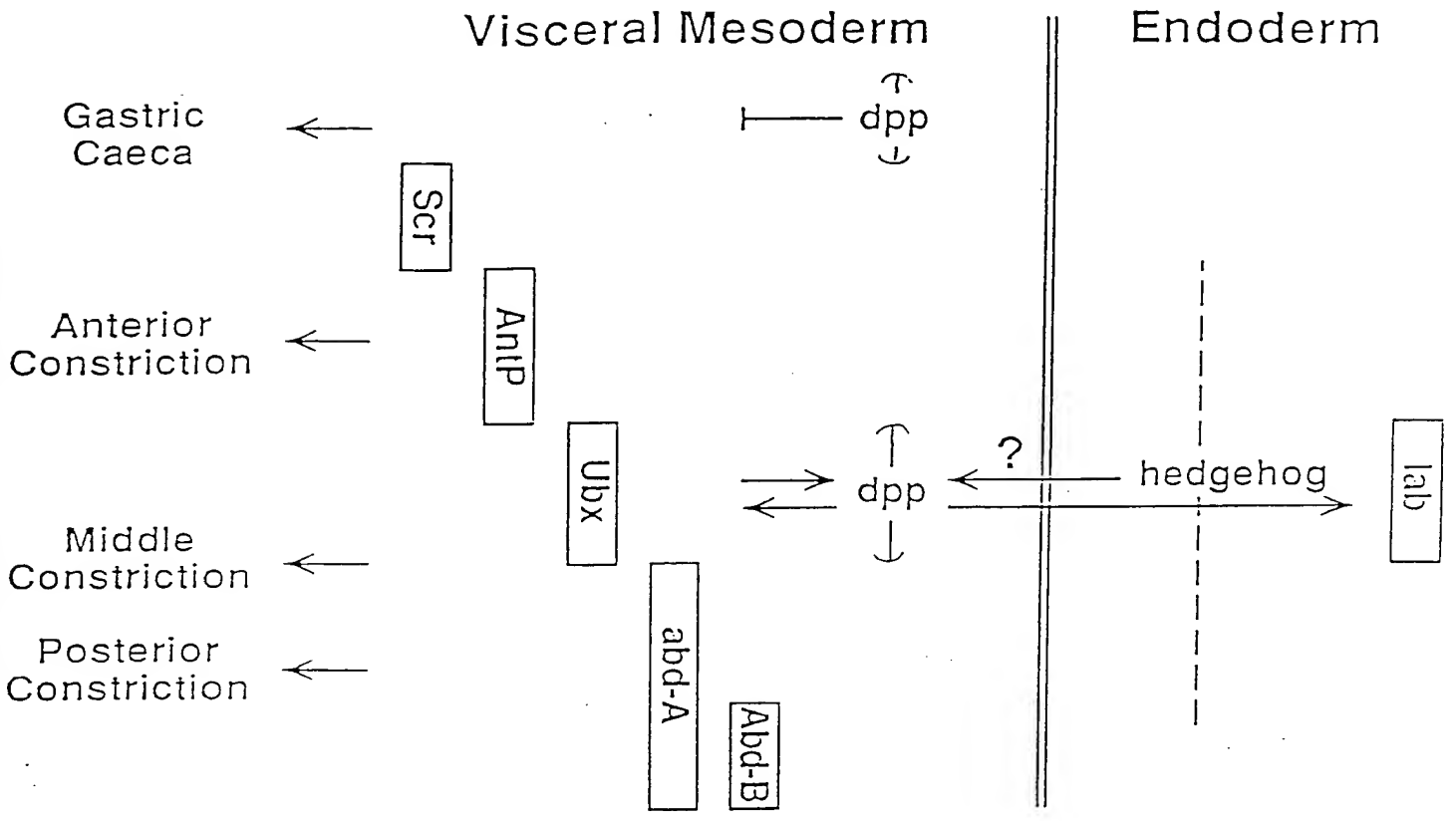


FIGURE 15A

08954771.102097

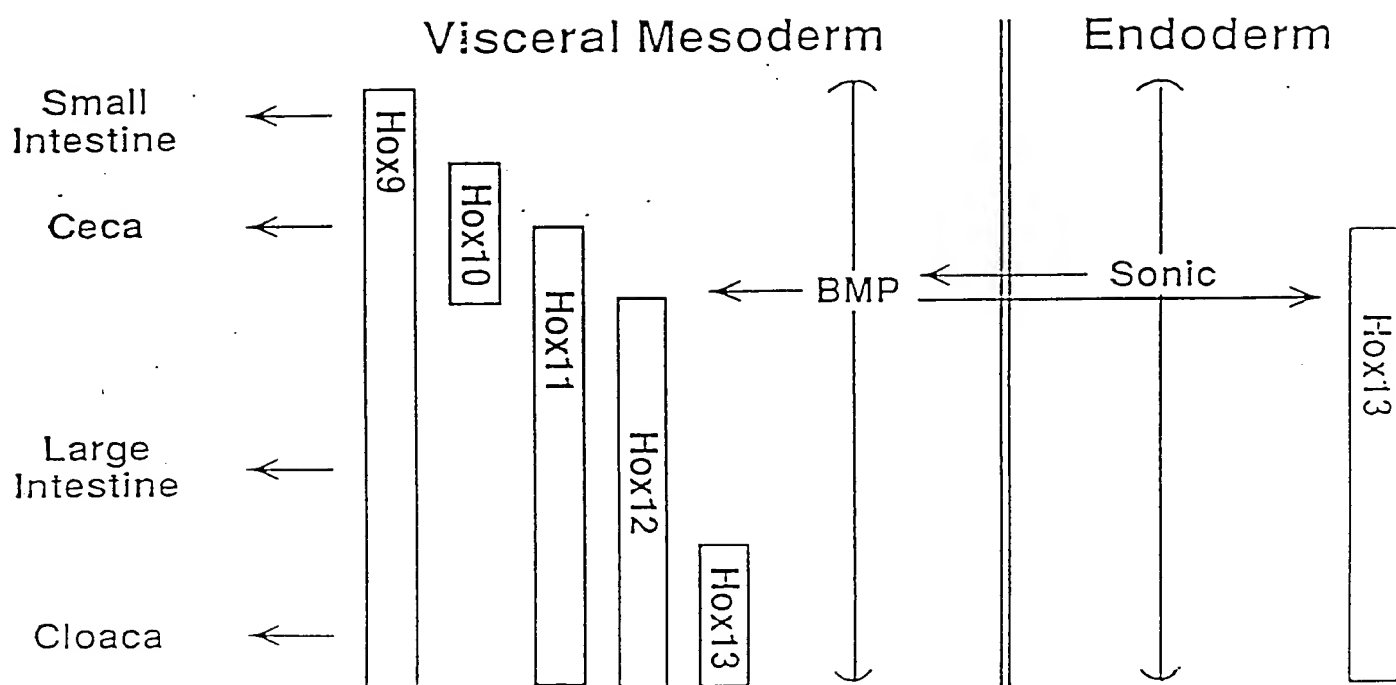


FIGURE 15B

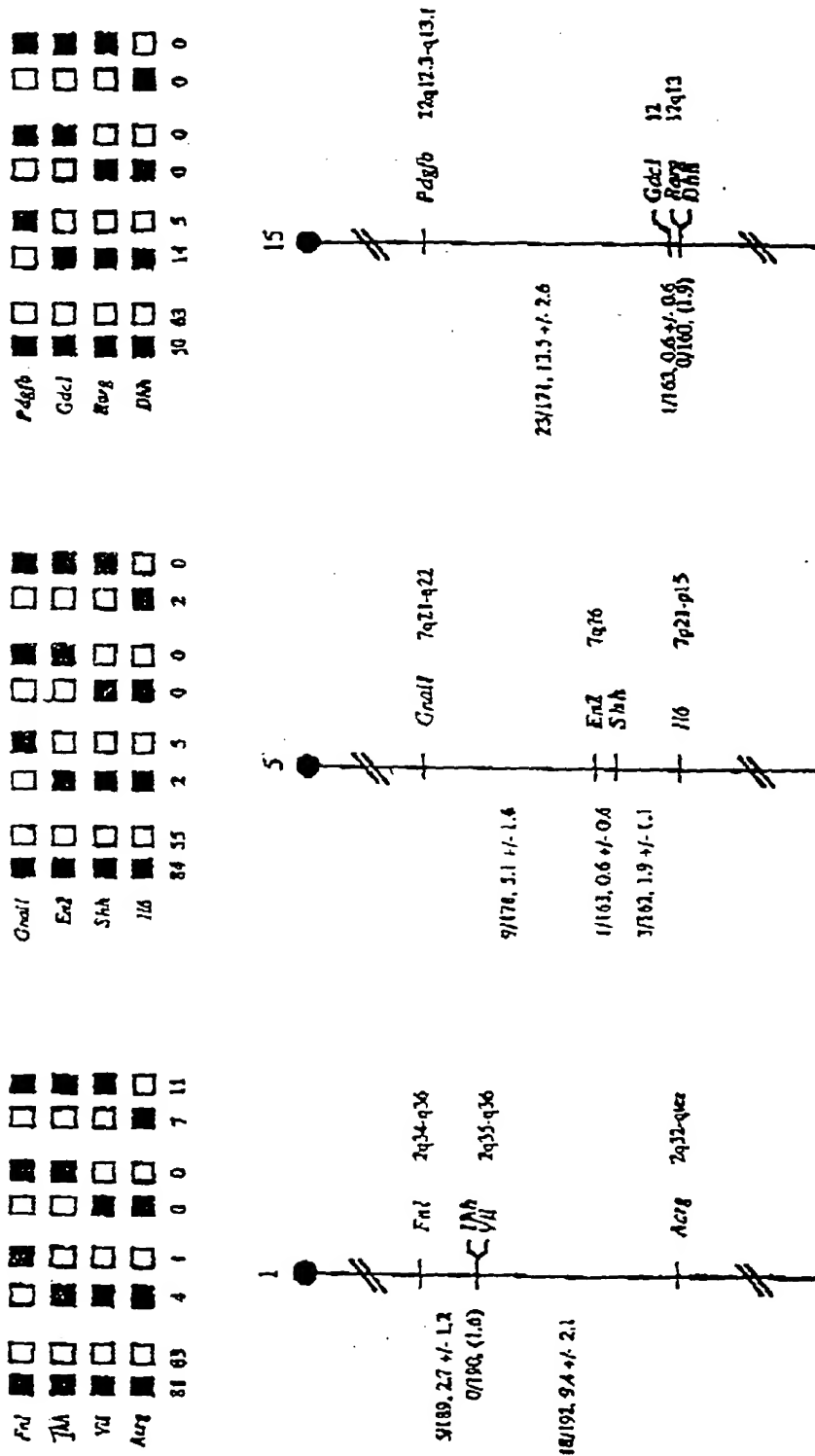


FIGURE 16